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THE ARSENAL OF DEMOCRACY

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THE subject of this pamphlet is the economic contribution of the United States towards the defeat of the Axis Powers. After describing the movement of American opinion and action towards 'all aid to Britain' and her Allies, the author (who has been engaged on a continuous survey of the economic side of the war) discusses the war-potential of the United States and its mobilization in defence of the Western Hemisphere and of Britain. He sets out the problems of the transfer of a peace-time economy to a war footing, with the bottle-necks of machine tools, skilled labour, and raw materials; the results achieved and the plans laid down for shipbuilding, aircraft construction, and other supplies; and the relative strength of the Axis Powers and their opponents, with special reference to the time factor.

A more detailed account is given in C. J. Hitch's *America's Economic Strength* (World To-day Series, 2s. 6d. net).

The background of *American Foreign Policy* may be studied in D. W. Brogan's Oxford Pamphlet (No. 50) on that subject, and in Allan Nevins' *America in World Affairs* (World To-day Series, 2s. 6d. net).

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THE ARSENAL OF DEMOCRACY

The President's Statement

SO now,' said President Roosevelt on 15th March 1941, 'our country is to be what our people have proclaimed it to be, the arsenal of democracy.' The object of the following pages is to explain why the people of the United States have come to this decision, what help they have given to the other democracies what resources they have for making their arsenal, and how quickly they are making it.

The American Attitude to the War

The magazine *Fortune* has conducted surveys at various times during the war which show very clearly the changes of American opinion. In October 1939, a month after the outbreak of war, 83 per cent. of the people asked wanted Britain and her Allies to win, while only 1 per cent. wanted Germany to win. At the same time, only 3 per cent. wanted to enter the war at once, and only another 13 per cent. wanted to enter it even if Britain and her Allies looked like being defeated. As the law stood at that date, the United States could not even export arms to a belligerent country, though the majority of opinion, apparently, was in favour of amending this, as was subsequently done. The American attitude, therefore, was the traditional one of sympathy for other democracies

coupled with determination to keep out of foreign entanglements if possible.

What was the reason for this attitude? As regards the first element—the sympathy for other democracies—its origin is clear. The people of the United States are largely descended from ancestors who went there to escape from forms of government oppressive to them, so that they are acutely aware of the advantages of political freedom and tend to be more individualistic by temperament than the people of most other countries. Moreover, the sense of nationhood in the United States is inevitably founded far less upon a consciousness of a common history than is the case in older countries, and is therefore focused upon the democratic ideals embodied in the United States Constitution, which most Americans still regard as nearly perfect.

As for the element of isolationism in the American attitude to European affairs, it also is largely due to the individualism of most Americans and the desire of many of them to cut adrift from the troubles of a continent which they or their ancestors left not entirely regretfully. Even more, however, it is due to the facts of geography. The United States is the only great Power in the Western Hemisphere, so that the likelihood of a direct threat to it seems at first sight small. Moreover, many of its citizens live so far inside its frontiers as to be reminded only rarely that their country has any necessary connections at all with the outside world. In fact, the economic dependence of the United States upon the outside world is far smaller than that of any other advanced country. Before the war, Britain imported about a sixth of all the goods and services she used, Germany imported a fourteenth, the British Empire as a whole a twelfth,

Continental Europe a seventeenth, and the United States only a twenty-fifth.

It is clear on closer inspection, however, that complete isolation is not possible, even for the United States. Not only is it a fact that she became involved both in the Napoleonic Wars and in the Great War of 1914-18, but her position as the only great Power with substantial territory in the Western Hemisphere obviously has to be maintained in the face of any European or other Power ambitious to establish an empire in Latin America. Hence there arises the famous and much misrepresented 'Monroe Doctrine.' On 2nd December 1823, President Monroe told Congress that 'the American Continents, by the free and independent conditions which they have assumed and maintain, are henceforth not to be considered as subjects for future colonization by any European Powers.' This warning, however, would certainly not have been effective had it not been that the British Government supported the policy of preventing European intervention in Latin America, for then, and for the rest of the century, only Britain possessed the naval power necessary to protect the New World from the Old. Hence, the maintenance of the freedom of the Western Hemisphere from European interference demands that the seas shall be commanded either by Britain (or some Power equally sympathetic with United States policy) or by the United States herself.

In the summer of 1940, when many Americans thought that Britain would be defeated, it was clear both that the Powers threatening to overcome her were anything but sympathetic with the Monroe Doctrine, and that the United States was then in no very strong position to oppose them. A German plot (by no means the first of its kind in South America)

had been discovered earlier in the year which apparently had the object of converting Uruguay into a 'German colony of peasants.' Hitler has been reported by Dr. Rauschning to have confessed to designs upon both Mexico and Brazil, and there have been several more recent Nazi attempts to overthrow other Latin American governments.

The United States Navy at the beginning of the war, though about equal in strength to the British, and therefore one of the two most powerful in the world, was outnumbered in every category of ship by the combined navies of Germany, Italy, and Japan, and the small fleets of the other American countries were not sufficient to make up the balance. On land and in the air the United States position was far less favourable still: her standing army, numbering only some 200,000 men, with only 19 modern medium, and 457 assorted light and no heavy tanks, was clearly insignificant beside the German Army of several million men, with its ten or more armoured divisions; her Army Air Corps, with 21,000 men and only 2300 aircraft of all kinds, was equally negligible in comparison with the Luftwaffe probably ten or fifteen times as large. In the year before the war, the three Axis Powers had spent more than seven times as much on armaments as the United States. The last column in fig. 1 (facing title-page) shows the situation clearly.

It was not surprising that as the position of Britain became more critical, these facts weighed more and more with Americans. According to a *Fortune* survey in June 1940, only 32 per cent. of them then thought that Britain would win the war, and 93 per cent. thought that the United States should spend whatever was necessary to build up the armed forces as quickly as possible—an opinion entirely consistent with

the belief, held by 78 per cent. of those asked, that a victorious Germany would interfere in South America, and of an only slightly smaller proportion that she would try to seize territory on the American side of the ocean. A majority of those with definite opinions on the point also believed that the Axis Powers, if victorious in Europe, would try to attack the United States as soon as possible.

The Battle of Britain had the effect of re-establishing American faith in the power of Britain to survive. In October, no less than 63 per cent. of the Americans asked believed that Britain would win—nearly twice the proportion of four months earlier. The natural conclusion from this new belief was that Britain, being a defensible outpost of democracy, should be helped to resist even if that meant slowing down the growth of the United States forces themselves.

Moreover, it came to be realized that it was necessary to think not only of the immediate future, but of the long run as well. The immediate fact was that the United States was weak in a military sense and that her first duty was to rearm. It became clear, however, that even a completely rearmed United States would not be in a comfortable position if opposed by an Old World under Axis domination. In the first place, it is never comfortable for a democracy to be fully armed; it involves sacrifices not only in standard of living; but in political freedom also. Secondly, many Latin American countries are economically dependent upon European markets, and, with all Europe under Nazi domination, the United States would have to face not only the military threat to the Western Hemisphere from outside, but also the threat of penetration from within, based upon economic blackmail. Thirdly, a survey of the war potentials of the World Powers,

assuming that they are all prepared to arm to the teeth, shows that the position of the United States in the long run could not be made by any means completely secure, even by the greatest sacrifices on her part, if the New World had to stand alone.

The War-Potential of the United States in relation to other Powers

There can be little doubt that, in ultimate capacity to support modern war, the United States is far the greatest of the World Powers (see fig. 1). Her population, it is true, is only a sixteenth of the world total, and is surpassed in size by the U.S.S.R., China, and the British Empire, but population is less important in modern war than production. In the value of goods and services produced, the United States ranks easily first. Her output is about a quarter of the world total, is three times as great as that of the United Kingdom, nearly three times as great as that of the U.S.S.R., and twice as great as that of Greater Germany, even though she was, in the year 1940 to which these comparisons refer, working much further below her utmost capacity than any of the other countries mentioned. Indeed, her capacity to produce is probably greater than that of the whole of Continental Europe, excluding Russia. In the field of industrial production, which is still more relevant to war-potential, her position is more favourable still. In 1937 her industrial output was about 40 per cent. of the world total, the share of Continental Europe (without Russia) being about 28 per cent., of the British Empire about 15 per cent., of the U.S.S.R. about 10 or 12 per cent., of Japan about $3\frac{1}{2}$ per cent., and of Italy somewhat less than

this. Her position is perhaps even more favourable still if the comparison is limited to the particular industries which are most closely connected with war—metals, engineering, and chemicals. In these she possesses little less than half the capacity of the whole world. (See the comparison of steel-making capacities in fig. 1.)

Thus, taking into account the fact that she is far the most nearly self-sufficient of the great Powers (except Russia), one can see that her position, if she were fully armed, would be immensely strong. The fact that, to complete her independence of the Eastern Hemisphere, a very considerable amount of adjustment would be necessary, does not disturb this conclusion. Yet the fact that Continental Europe alone, excluding Russia, has more than $2\frac{1}{2}$ times the population of the United States is not without its importance. This population, organized and driven by the Nazis, and commanding all the resources of the Old World, would in time be able to produce a war-machine excelling the greatest which the United States could maintain. Even America could not, in the really long run, stand against the rest of the world.

The policy of helping Britain was therefore seen to be necessary, not only to give the United States time to arm, and not only to avoid a conclusion to the war which would impose upon America the need for permanent and enormous sacrifices in the interest of security, but in order also to give America the minimum conditions of security in the long run. Hence, it is clear why the people of the United States have gradually come to the view that the only satisfactory measure of American defence is one which ensures the final defeat of the Axis Powers. This is now seen to involve giving all possible help, not only to countries

whose strategic positions are important and whose institutions the American people admire, but to all countries which are helping towards the desired end, including Russia. The American attitude to the belligerents may be said to have been founded in the beginning mostly upon ideals and sympathies, but events have transferred it on to a basis of grim necessity.

American Defence and Aid to the Democracies

Before considering the growth and problems of American war industry, it will be useful to summarize very briefly the steps which have been taken, both to defend America and to help the nations actively resisting aggression. The defence of America has been strengthened by the initiation of an enormous expenditure on armaments, by conscription, and by the acquisition and fortification of strategic bases. The total defence estimates submitted in January 1940 amounted only to £385 million, though there was an additional plan to spend £164 million on the Navy over a five-year period. By the end of July 1940 the total defence programme had expanded to £2500 million. It included provision for building a 'two-ocean navy,' involving the construction of 200 extra warships by 1946 or 1947, and for equipping an army of 1,200,000 men, with certain reserves of equipment for 800,000 more. The amount actually spent on defence in the year ending June 1941 was £1507 million, and the total defence programme authorized or asked for by the end of July 1941, excluding help for other democracies, was estimated to cost no less than £11,000 million, or more than twice Greater

Germany's annual war expenditure, though this cost will necessarily be spread over some years, and the rate of total defence expenditure reached by August 1941 was under £3000 million per annum. The present programme calls for the complete equipment of an army of 1,727,000 men, with essential items of equipment for 3,000,000 men. Conscription was introduced in September 1940, when the calling up of 800,000 men per year was begun. In August 1941 it was decided to retain the first year's draft for a further period.

The programme of acquiring and fortifying bases has been even more spectacular. In September 1940 the United States acquired from Britain the lease of sites for bases in British Guiana, the West Indies, Bermuda, and Newfoundland; in April 1941 it was announced that United States bases were to be set up in Greenland, and in July United States troops began to take over from the British the task of occupying Iceland. The North Atlantic approaches to the United States and the nearer approaches to the country's western seaboard and to the Panama Canal were thus covered. In the Pacific, United States bases are being enlarged or constructed in the Hawaiian Islands, Guam, the Philippines, the Aleutian Islands (west of Alaska), and in the Phoenix Islands and Tutuila in the Central Pacific, while the military defence of the Philippines has been put under the control of the United States forces. The approaches to the Americas from the West, and their important communications with South-East Asia, are thus also being protected. The defence of the Western Hemisphere has been further consolidated by the work of the U.S.-Canadian Joint Defence Board, which has made plans for joint action in defence of both countries' territories, and by the Act of Havana, by

which all the American Republics agree to take joint action to prevent European colonies in the Western Hemisphere from falling into Axis hands. The system of keeping up naval patrols far out into the Atlantic, with orders (since 16th September 1941) to 'shoot first' at Axis raiders and to protect all ships over a large part of the North Atlantic, is the most active measure of American defence so far, and is consistent with traditional United States policy.

No less important than the development of the armed forces and bases for these is the securing of adequate supplies of strategic materials. A considerable number of these—notably tin, rubber, manganese, and tungsten—are not produced in adequate quantities in the Western Hemisphere, and a programme of accumulating stocks, as well as developing productive capacity and substitutes, was therefore initiated in June 1940.

The history of aid to Britain and her Allies falls into two periods—the first period of purely commercial relations and that in which aid has been a matter of national policy. At the beginning of the war, as mentioned above, the sale of arms to belligerents was forbidden, but in November 1939 the Neutrality Act was amended so that the belligerents could buy arms if they paid cash for them and provided for their carriage in non-American ships. All American ships were at the same time prohibited from approaching belligerents' territories. The French and the British Governments, who had been buying American aircraft since before the war, thereupon resumed their purchases of supplies of all kinds on a very large scale, Britain drawing heavily for this purpose upon her reserves of gold, dollars, and American securities.

The second period may be said to have begun after

Dunkirk, when the United States allowed the sale to Britain of large stocks of old rifles, machine-guns, and field guns. In September 1940 there followed the immensely important transfer to Britain of 50 old American destroyers, coinciding with the agreement to lease bases in British territory to America free of charge. During the later phase of the Presidential campaign, it was clear that both candidates had made help to Britain the main point of their foreign policy, and the importance attached to this help was revealed by President Roosevelt in the first press conference after his re-election, when he stated that, for some weeks past, it had been understood that newly produced war material which was competed for by the United States and British Governments should be divided more or less equally between them. That the United States Government should regard the arming of Britain as of equal urgency with the arming of its own forces was a remarkable proof of its realization of the vital importance of Britain's survival, and this realization was shown in many ways in the following months—by the steps which were taken, for instance, to release for Britain aircraft ordered by the United States Government, and to persuade American companies to accept British armament orders.

The next great stage on the road to full aid to Britain, 'short of war,' was the Lease-Lend Act, which was signed on 11th March 1941. The reason for this measure was that the British Government by the end of 1940 had spent, in the United States and elsewhere, £578 million out of the £1120 million of gold, dollars, and American securities which she had possessed at the beginning of the war, as well as the dollars which she had earned by her exports of goods

and newly produced gold in the meantime. The reserves remaining were only just sufficient, together with her probable exports and gold production during 1941, to pay for the £908 million worth of goods on order and due for delivery during that year. But for the Act, therefore, Britain could have obtained from the United States after the end of 1941 only what she could pay for by exports and gold production—*i.e.* probably only about half as much as she had been getting before that date. The Act prevented this reduction in the flow of supplies by empowering the President to lease, lend, or sell to any country whose defence he deemed vital to the defence of the United States, defence material built for the purpose in the United States or otherwise obtained. Food, raw materials, and machinery were included for this purpose as 'defence material,' and the Act was drawn up to cover also repairs, etc. in American dockyards to the ships of countries assisted. A sum of £1750 million was at once voted for the provision of such material, and in addition to this, the President was empowered to transfer goods belonging to the U.S. Army and Navy to assisted countries up to a total value of £325 million. In October 1941 a further £1500 million were voted under the Act.

Since the passing of the Act, further financial help to a total amount of £167 million has been given to Britain in the form of American Government loans and similar forms of assistance, which will contribute to the financing of orders already placed.

The chief measures of direct aid to Britain after this was the scheme to train 8000 British airmen a year in the Southern States, and the formation of the Shipping Pool, which is described below. Further developments of American policy, including the granting of

aid to Russia, are to follow the meeting between the President and Mr. Churchill in August 1941, and the Moscow Conference. What form this aid will take is, of course, beyond prediction, but there is no doubt that it will grow with America's power to give it, and will be treated, more and more, as a matter of urgent national necessity.

This very brief outline of the steps taken for American defence and the provision of aid to Britain and her Allies shows clearly how closely interlocked are these two objects of policy. Not only does the strengthening of the American position help to keep the enemies and potential enemies of Britain in check (as in Greenland and Iceland, for instance), not only does the clearing of raiders from American defence waters greatly relieve the pressure on British and Allied shipping, but Americans realize that Britain itself is more important strategically for the defence of America than any outpost now occupied by the forces of the United States.

The Development of the Defence Industries

The process of turning an industrial system, however powerful it may be, to the production of armaments in large quantities is necessarily a long one. An advanced industrial community can eventually reach the point where half or more of its output of goods and services is for defence. Germany and Britain reached this point, or something near it, in the last war, though only in the third and fourth years of the conflict. The United States was not at war long enough to reach it, and at the time of the Armistice was devoting about a quarter of her output to war purposes. In the present war Germany had a flying

start. Fig. 2 (at end) gives some indication of the lead which she had over other Powers in the total value of her expenditure on armaments (she had spent £5000 million on them in the five years ending September 1939, whereas Britain had spent less than £1400 million and the United States £840 million), but it is important to realize also that the years since 1933 had been spent in a conversion of German industry to war purposes which, compared with what Britain and America have had to perform, was leisurely. As much as 21 per cent. of all German output of goods and services was spent on war preparation in the year 1938, when the proportion so spent in Britain was $7\frac{1}{2}$ per cent. and in the United States $1\frac{1}{2}$ per cent. (see fig. 3).

In the United States at the outbreak of war, and even in June 1940, when most Germans and many Americans thought the war in Europe was nearly over, the production of armaments was confined to a comparatively small number of Government and private plants, and, though something had been done to 'educate' other firms to produce them by small orders widely placed, the effect achieved was very small. It is true that the United States had the capacity to produce as much steel and three times as many motor vehicles as all the rest of the world, and had enormous reserves of unemployed labour and twice as much power per person engaged in industry as any other country, but, though these resources are important in the long run, their usefulness is limited at the beginning of rearmament by shortages of particular kinds of productive machinery, particular kinds of skilled labour, and particular kinds of material.

The productive machinery which is scarce consists mostly of machine tools—machines for the accurate

working of metal. Ordinary peace-time industry in the United States, such as the motor industry, possesses, of course, great numbers of these tools, but they are very largely highly specialized machines capable of producing only narrow ranges of products. In one motor works, it was found that 85 per cent. of the machinery was useful only for the particular purpose for which it was used. It could make, say, motor-car crank-shafts but not aeroplane crank-shafts. Where particular machine tools already in existence are useful for war-material production, it is frequently the case that the production of the material concerned also requires other machine tools not already available, so that those which are at hand cannot be set to work immediately. Machine tools thus constituted the first great 'bottle-neck' in American defence industry. Sales of them even in the great boom year of 1929 had amounted only to £46 million, while in March 1941 they were already at an annual rate of £172 million. The rate at which they can be supplied to war industry is limited, not only by shortage of the very high and special skill which is needed in their manufacture, but by the fact that a considerable proportion of the output in the early days of expansion is needed by the machine-tool industry itself. The export of these vital pieces of equipment has been very strictly controlled by licensing since December 1940, and they were among the first commodities with regard to which a system of mandatory priorities was imposed, so as to give defence industry the first call on them.

The shortage of skill has hitherto been apparent mostly in particular industries such as machine tools and aircraft, but with the completion of 'tooling-up' it will become much more widespread. General Motors,

for instance, expect to need 60,000 additional skilled men for defence orders. The Office of Education is subsidizing engineering colleges, in which 50,000 workers in defence industry are already enrolled, the thousand or more vocational schools of the country, which have already more than two million pupils taking part-time courses, are also receiving Government grants, and the industries themselves are doing a great deal of training—the Ford Company, for instance, is expanding its capacity so as to train 10,000 men per year. Moreover, though American industry works a nominal forty-hour week, the available resources of skill can be made to go a good deal further by overtime work, and the average number of hours per week worked in twenty-seven industries in March 1941 was over 41.

The shortage of materials was first apparent in the light metals, aluminium and magnesium, which are used largely in aircraft manufacture. Though America produced between two and three times as much steel as Greater Germany, her aluminium output has been well below the German level, and her magnesium output in 1941 is expected to be only between a half and a quarter of that of Germany, though it should shortly be doubled. It is officially stated that about thirteen times the output possible in mid-1941 will be needed by the end of 1942. As to aluminium, output in August 1941 was at the rate of 635 million pounds per year (compared with a capacity of about 1000 million pounds in territories under German control), and the official estimate is that military needs in 1942 will be two or three times as great as this. New private plant under construction should expand output by 120 million pounds, but the Government's Defence Plant Corporation (which

builds plants and leases them to private firms for operation) is to construct further capacity to produce 600 million pounds per year. The great expansion in aluminium and magnesium production brings in sight what would otherwise appear a remote possibility—a shortage of power (12 kilowatt-hours of electric power are needed for each pound of aluminium produced), and the Government's great water-power schemes carried out in the depression years are not only going to prove necessary far sooner than was expected, but will have to be extended.

It is plain from this example how shortage spreads from the original bottle-necks to branches of production which were recently thought to be capable of meeting any likely demands upon them. This tendency is aggravated by the fact that much of American industry, after the last eleven years of depression or of incomplete recovery, has large arrears of maintenance and replacement of equipment to make up. The railways, for instance, are short of rolling-stock. This fact, together with the direct and indirect defence demands, including the urgent demand for ships, for more rail transport and oil pipelines to replace ships transferred from coasting trade to duties connected with aid to Britain, for new factories and power plants, and for more motor-cars as private incomes rise, has created a shortage even of steel. Though output of that metal has been at a rate of almost 80 million tons per year, not only have priorities had to be allotted to defence needs, but an official report at the end of May 1941 stated that there was likely to be a shortage of 1.4 million tons in 1941 and of 6.4 million in 1942. An increase in capacity of 10 million tons has therefore been asked for, and civilian consumption is to be restricted to hasten this.

The output of motor-cars in particular (sales in the early months of 1941 being no less than 40 per cent. above those of a year before) is to be cut down. The steel shortage, too, is worst in special grades used for defence. A particular effort has had to be made to increase electric furnace capacity for the highest grades of steel for machine tools, aircraft engines, armour plate, etc., for the naval demand for armour plate alone is five times as great as before the 'Two-Ocean Navy' programme, and on top of this there is a new demand for light armour for tanks and aircraft.

Labour and Administrative Problems

To these physical difficulties of expanding war industry quickly are added the inevitable administrative and labour difficulties due to the political and social conditions of the country. The United States in the last ten years has been through, not only a great economic depression, but a time of great social and political tension which, in a country with less sound institutions and less common sense, might easily have given rise to catastrophic disturbances. The legacies of this period which are most important from the present point of view are the hostility of many business men to the President and to the more ardent economic planners—the 'New Dealers'—among his advisers, and the unfinished controversy about the rights of labour to organize. The difficulties created by these things have been made greater by the fact that the United States is not only not at war, but has only very gradually approached the position where it was possible for the President to declare a 'state of unlimited national emergency,' as he did on 27th May 1941.

Neither of the factors mentioned has, in fact, hindered the Defence Programme very much. There was apparently some reserve in considerable sections of the business community about undertaking costly and difficult developments, and there was delay in bringing in legislation providing for sufficiently large depreciation allowances in connection with such developments. A few important producers refused at first to make armaments for Britain, but they have mostly been persuaded to change their minds. Moreover, though there has been continuous discussion as to whether 'business' or 'New Deal' elements were uppermost at the moment in the administration of the Defence Programme, it is significant that this distinction is gradually giving place to one between those who want to go faster and those who think the Programme is going fast enough—a distinction not always along the same lines as the earlier one. The chief effect of the old hostility of important business men to the present Administration has been to necessitate the use of tact and personal prestige instead of compulsion. The National Defence Advisory Commission, for instance, which was in charge of armament production from May 1940 until its powers were largely transferred elsewhere in January 1941, had relatively little legal authority, and relied largely upon the prestige of its members, which included Mr. Knudsen, an ex-President of General Motors Corporation, and Mr. Stettinus of United States Steel. More recently, the gradual movement of public opinion, and the important fact that the Presidential election is over, have enabled more compulsory powers to be taken and the Supply Priorities and Allocations Board and the Maritime Commission have acquired powers over the distribution and pricing of materials and

over means of transport which are rapidly approaching those of the Ministry of Supply, the Board of Trade, and the Ministry of Shipping in Britain. The machinery for administering the United States Defence Programme, having grown up and acquired its powers gradually as circumstances permitted or demanded, still presents a somewhat ragged appearance, and until its reorganization at the end of August 1941 presented a still more ragged one, which distressed many Americans, but it has already shown that it is extraordinarily flexible, and it may undergo considerable further changes.

Labour problems have affected, or threatened to affect, the course of events in two ways. In the first place, the necessity of securing the goodwill of labour, as well as of capital, was partly responsible for the rejection of the machinery which had been previously planned for wartime economic mobilization in favour of the piecemeal development mentioned above. Secondly, there have been a small number of strikes in industries vital to defence, none of them supported by the great national trade union organizations (the American Federation of Labour and the Congress of Industrial Organizations), but some of them quite important enough to irritate public opinion. The danger arose that repressive legislation might be demanded for dealing with these which might have led to real trouble, but the Government seems to have averted this danger by taking adequate, but not repressive powers. The situation has been complicated by the fact that several employers have been defying the recent legislation defining the rights of labour (the Wages and Hours Act and the Wagner Act), thus inviting trouble, but the main culprits have been persuaded by various means (including in one

case at least the refusal of a Government contract) to make their peace with the Unions. The total amount of interference with production has, in any case, been quite small for a time when profits are rising, and surprisingly so if one considers the rising strength of trade unionism and the fierceness of the struggle from which it has scarcely emerged.

Output and Aid: (1) Shipping

Two particular branches of American production are of the utmost importance to Britain and her Allies, though for somewhat different reasons. An enormous increase in the rate of American shipbuilding is absolutely essential if Britain is to survive and receive supplies for carrying on the war. American aircraft, on the other hand, are important not merely because they afford the means whereby Britain will shortly gain the advantage over Germany in quantity as well as in quality, but because output of them is far further advanced than that of any other weapon.

Notwithstanding that Britain secured the use of a very large tonnage of ships from her Allies whose countries were overrun by the Germans, the effectiveness of her merchant fleet was reduced by the delays necessitated by convoy work and the great increase in the average length of haul due to the cutting off of European sources of supply and the closing of the Mediterranean, and by the need of the Navy for auxiliary vessels. Thus, even apart from losses by sinking, she had no tonnage to spare, and sinkings after the German seizure of the French ports in June 1940 reached an alarming rate, which in the early summer of 1941 was over six million gross tons per

year, though in the following quarter the annual rate of loss had sunk, thanks largely to the U.S. naval patrol system, to less than two million gross tons. British and Dominions output, reduced as it was by the competing demands of the Navy, could not have been much more than one million tons per year.

The shipbuilding capacity of the United States is already partly taken up with the building of naval vessels and auxiliaries. The number of ways for sea-going ships in May 1941 was only 139, and the estimated output of merchant shipping in the whole of that year was expected to be only about 850,000 tons. The United States therefore needed, if her aid was to reach Britain in the growing volume intended, to repeat her feat of 1917-19, when she attained an output of three million tons of shipping in a single year. The great plant at Hog Island—the 'magic city of American genius'—which was largely responsible for this feat, turned out the first of its standardized 'ugly ducklings' a month after the Armistice, and fifteen months after the signing of the contracts. Such an output therefore clearly takes time to achieve, and the realization that ships for Britain was a supreme need did not come in America until the end of 1940. The present position is that the British Government has 60 standardized 'ugly ducklings' of about 7000 tons each on order in America, 112 more are on order for it under the Lease-Lend Act, in addition to 100 more orthodox vessels, while the Federal Maritime Commission has orders of its own for 200 more 'ugly ducklings' and a large number of fast new ships. The tonnage to be delivered in 1942 has been estimated at over three million gross tons (though there are also lower estimates), and sometime in that year all or most of the new ways should be finished, giving a capacity

of 500 merchant ships totalling close on four million tons per year. 82502 / 15839

The problem as it appeared in the spring of 1941 was therefore to bridge the gap between then and the time, probably in 1942, when the combined British and American output passes the rate of sinking, assuming that this becomes no worse. To this end, Britain had already bought 600,000 tons of American shipping in 1940. On 1st May 1941 the President asked the Maritime Commission to obtain a pool of at least two million tons of ships to be put at the disposal of the Democracies, and this has been done, partly with the help of the 86 Axis ships which were seized in United States ports. About 100 of these ships are, or are to be, put on to the task of supplying the Allied forces in the Middle East (in the summer of 1941, 20 or 25 ships per month were sailing to this destination), 10 have been put on to the service to Rangoon to help China, but the majority are plying between various Western Hemisphere ports and New York, relieving British and Allied ships which are thereby enabled to concentrate on the vital North Atlantic traffic. This traffic has (as mentioned above) been greatly assisted by the American naval patrols on the route to Iceland and elsewhere. Legislation to permit the arming of American ships and their access to the war zones was introduced into Congress in October 1941.

The shipping situation has been relieved also by the practice of flying aircraft to their destination. Many hundreds of American-built bombers have been flown across the Atlantic, and arrangements have been made for American civil pilots to fly aircraft across the South Atlantic to West Africa and on to Egypt. Bases in Greenland and Iceland may make it possible to fly fighter aircraft across the North Atlantic also, or they

may be flown over in sections in the bombers, for the delivery of all American aircraft by air has been stated to be the official object.

(2) Aircraft

One of the main reasons why the aircraft industry itself is so much more advanced than any other branch of war production is that the British and French Governments had placed large orders and even invested capital in the industry themselves before the war and in its earlier stages; British investments in American industry between the outbreak of the war and the Lease-Lend Act amounted to no less than £44 million, and a large part of these investments was probably in the aircraft industry.

The wartime history of American aircraft production may be divided into four stages. In the first stage, which lasted until the autumn of 1940, only the aircraft industry proper was concerned, and the main difficulty was shortage of engines, especially liquid-cooled engines, which were manufactured only by the Allison division of General Motors. In the second stage, efforts were made to get the help of the motor industry. The first success was the agreement of the Packard Company to produce Rolls-Royce 'Merlin' engines for Britain and the United States, the first of which came off the assembly lines at the beginning of August 1941. Startling claims were made both by Mr. Ford and Mr. Reuther, a prominent trade union leader, as to the immense output of aircraft engines which the motor industry could make, mostly with existing plant, but these claims have been shown to be extravagant, for the reasons mentioned above, and motor manufacturers have been both more

willing and more able to build special plants for aircraft production than to adapt their existing plants. Their contribution to the speeding-up of output has therefore been largely one of experience and technique. The Ford Company, for instance, which has developed an entirely new liquid-cooled engine besides undertaking to manufacture Pratt and Whitney air-cooled engines, had to build a new plant for the purpose, and began production only in the summer of 1941. By this time engines had ceased to be a bottle-neck, for output was already as high as 2400 per month in March 1941, and was expected to rise to 6000 by March 1942.

The third stage began in the early summer of 1941, when attention was concentrated upon heavy bombers, and the hope was expressed that output of these would eventually reach 500 per month. Effort was concentrated upon two types of four-engined machines—'Liberators' and 'Fortresses'—and work was started on four Government-owned plants in the Middle West to assemble parts made by motor firms. At this stage, shortage of aluminium components was the chief 'bottle-neck,' and the collection of aluminium cooking utensils for scrap was resorted to, as had been done in Britain a year before. The fourth stage was foreshadowed when the motor industry, in June 1941, entered the field of complete aircraft production with the Ford Company's decision to build 'Liberator' bombers, as well as supplying parts of them for assembly elsewhere.

What is the result of this development? Output of military aircraft rose from 547 machines in July 1940 to 1914 in September 1941. Exports, which were mostly to the Allies, averaged 117 per month in the second half of 1939, were 331 per month in the six months

after the fall of France, and had risen to 591 by April 1941. Moreover, the number of separate engines exported, which at the beginning of the war was only slightly more than the number of complete aircraft, was more than 1000 per month by the spring of 1941. It is hoped that output of complete aircraft will reach about 3500 per month by July 1942, and if Britain and her Allies continue to get about half of them, as hitherto, their supremacy over the enemy should be secure. Current American estimates put German output at between 2000 and 3000 machines per month, and British output at 2000 per month or rather less, so that the critical importance of the supply which is already coming from America is clear. The Luftwaffe has already suffered defeat by the R.A.F., then numerically far inferior to it, largely because the latter had the advantage of machines more recent in design. It now has to face the prospect of numerical inferiority (for American capacity has every facility for expanding far faster than European), while there is no sign that its inferiority in quality is in any way diminished.

(3) Other Weapons and Goods

Production of weapons other than aircraft had to await development of plant which was not started until the late summer of 1940. Light tanks are relatively easy to produce, and many hundreds of them had been sent to the British forces by August 1941 (output in July was reported to be 10 per day). Many of them have done service in the Middle East. Medium (*i.e.* 28-ton) tanks are somewhat more difficult, but the Chrysler Corporation's arsenal for producing them should come into production in the autumn of 1941. Heavy guns will not be produced in quantity till 1942, but aircraft cannon, anti-tank guns, and anti-aircraft

guns were beginning to appear in the summer of 1941, and output of them was rapidly increasing from then. Small arms were probably reaching the stage of large-scale output about the same time. In general, it may be said that the progress achieved gives no reason to doubt that the official intention to produce most weapons in quantity by 1942 will be realized.

It must not be overlooked, of course, that help to the Allies has been given in many forms other than actual fighting-machines. Iron and steel exports to Great Britain, for instance, excluding scrap, were at a rate equal to about a third of Britain's whole productive capacity at the end of 1940. Machine-tool exports to Great Britain at the same date were at a rate of about £20 million per year, or perhaps a sixth or a seventh of the whole rate of American output, while 40 per cent. more of that output was going to American plants working on British orders. Above all, great help has been given in food and medical supplies. In August 1941 about 230,000 tons of foodstuffs were shipped to Britain, these shipments being worth about £4 million, and it was hoped to increase them so that the total value sent between March 1941 and July 1942 would be £188 million, or nearly 40 per cent. of the value of food imported by Britain from all sources in fifteen months before the war.

An idea of the total volume of help to the Allies can be got from the fact that United States exports to the British Empire in the first six months of 1941 were valued at £325 million (of which about half went to the United Kingdom). From the beginning of the war to October 1941 the British Empire had obtained about £1125 million of goods in the United States, the greater part of which had been paid for in gold and securities rather than goods and services.

The transfers to the Allies under the Lease-Lend Act, for which no current payment at all is necessary, will probably not become very large until the end of 1941. In the first six months of the Act's working, £47 million worth of goods were actually exported to the Allies under its provisions, a further £9 million more were awaiting shipment, and services (such as repairs to ships) had been rendered under the Act to the value of £20 million. In that period the American Government ordered over £1000 million worth of goods for the Allies, over a third of them aircraft, but delivery of these goods (other than food and raw materials) cannot begin until they have been produced, which, as explained above, takes a considerable time. Meanwhile, the very large deliveries of weapons and stores which are being made are mostly in fulfilment of old British orders. It is impossible to guess how important Lease-Lend deliveries will be in 1941, but they will certainly be enormous in 1942.

America and the Balance of Power

Fig. 2 (at end) shows the defence and war expenditures of the chief Powers from 1935 to 1940 measured in sterling. It will be seen from this that the British Empire's total war expenditure rose immensely steeply in 1940, till, at the end of that year, it was about two-thirds of that of Greater Germany—including in the latter's war expenditure the 'occupation costs' and similar exactions which have been wrung out of the overrun countries of Europe. A good deal of this great increase, of course, was made possible only by drawing upon the production of the United States through the sale of securities and gold in exchange for war material. The military expenditure of Russia, so

far as can be seen, would have rather more than bridged the gap between that of Germany and that of the British Empire in the middle of 1941, while that of the United States, already approaching two-thirds of the British Empire's expenditure, gave the Allies a very substantial advantage over their opponents. This advantage, however, is illusory because of two factors—geography, which prevents America, Russia, and the British Empire from bringing all their resources to bear against Germany and her allies at once, and the fact that the expenditure of the United States (and of the British Empire to a smaller extent) was still largely upon the means of making weapons, and was not yet matched by output of the weapons themselves. This, of course, is a trouble which time is needed to cure, and is the ground for the urgency of President Roosevelt's appeal for 'speed, and speed now.'

Indeed, time and preparedness have so far been much more important in this war than ultimate resources, and it will be some time before resources exercise anything like their full power on the side of the Democracies. Fig. 3 shows, roughly, the percentages of their total outputs of goods and services which the chief Powers have devoted to war and the preparations for it. The United Kingdom alone is now about as fully transformed to a war basis as Germany, but has attained a high degree of economic mobilization only much more recently than her enemy. The Dominions have worked wonders, but, because of their smaller degree of industrialization and the smallness of their defence expenditure before the war, are about a year behind the United Kingdom in their preparations. Russia made preparations which were relatively large long before she was actually engaged in a major war, but the full urgency of such a war came to her only

much later than to Britain. The United States, in degree of economic mobilization, is about a year behind the British Dominions, and about two years behind the United Kingdom. The people of Britain, who remember their difficulties and inadequacies of preparation in 1939, and the people of the Dominions, who remember their own corresponding embarrassments of 1940, will understand the troubles of Americans in 1941, but they can also judge from their recent experience how rapidly America's war production will expand in 1942, and, knowing her resources, they trust that even the output of that year will be only a beginning.

